THE VETERINARY RECORD

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888

No. 27. JULY 4, 1953 VOL. 65.

AN OUTBREAK OF NATURALLY ACQUIRED TUBERCULOSIS IN GOATS

BY

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READING

It has always been considered that goats seldom contract tuberculosis under natural conditions and records of the naturally acquired disease in goats are very scarce. Thompson (1904) mentioned that out of 1,562 goats slaughtered in 1894 in Saxony 10 were tuberculous, and out of 47,705 slaughtered in 1899 in Prussia 148 were encountered with this disease. Melvin (1908) stated that out of 45,953 goats examined under government inspection in the United States of America in 1908 one goat only was found tuberculous. Holmes Pegler (1926), under the heading of "Immunity from Tuberculosis Germs," quoted different authorities as to the extremely rare instances in which tuberculosis was found in goats. He mentioned that Dr. Pol Demade, Director of the Sanatorium at Haeltert, Belgium, in a paper delivered at the First National Congress for the "Improvement of the Goat," stated that there were in Belgium at one time 300,000 milch goats and 900,000 milch cows; among the first there was probably not one affected with tuberculosis, whilst among the cows there might be 50 to 75 per cent. affected, and stated that the goat is almost immune from tuberculosis. Griffith (1928), reviewing tuberculosis of the domesticated species of animals and the incidence of the disease in goats, stated that these animals seldom contract the disease in England. This immunity from natural tuberculosis he attributed to the hygienic conditions under which the goats are kept in England and not to any constitutional insusceptibility, as goats could readily be experimentally infected with bovine tubercle bacilli, "to which they are more susceptible than the bovine species." Feldman (1938) obtained figures from the annual reports of the Chief of the Bureau of Animal Industry for the years 1926 to 1936, showing that in nearly 317,000 goats examined by the Meat Inspection Division of the Bureau of Animal Industry, United States Department of Agriculture, one case only of tuberculosis was encountered.

A review of literature on the subject revealed only a few cases of naturally acquired tuberculosis in goats. Koch (1884) recorded such a case in a goat with cavity formation in both lungs accompanied by enlargement and caseation of the bronchial lymph nodes. The spleen and liver were also affected. Nothing was mentioned about the source of infection. Sluys & Korevaar (1891) described a case of generalised tuberculosis in a 15-month-old goat that was reared on cow's milk. M'Fadyean (1892) states that the first case described in England was probably that of Edgar (1892). The subject was a three-year-old goat and M'Fadyean confirmed the diagnosis histologically in the bronchial lymph nodes and lungs. Again the source of infection was not detected. Dulling (1896) recorded a case in a six-year-old goat that developed a cough over a period of two years. It gave birth to a healthy kid, but on account of its poor milk production was slaughtered. *Post-mortem* examination revealed that was suffering from tuberculosis and that the infection was confined to the thoracic cavity. Van Es & Schalk (1914) mentioned that two cases of acquired infection with avian tubercle bacilli were described by Steriopulo. Griffith (1917) recorded one case of natural infection in a young goat with the bovine type of organism which he encountered in 1914. This was one of twins about eight months old, bought for experimental purposes; when tested with tuberculin one of them reacted. Tracing the history of this case, it was found that because the dam had not sufficient milk for the two kids, one was hand reared on cow's milk and the second was left to be suckled by its mother. The first, brought up on cow's milk, reacted to the tuberculin test, while the second proved negative. The reacting goat was killed and *post-mortem* examination revealed a tuberculous ulcer in the small intestine, a caseo-calcareous tuberculosis of a pharyngeal and a mesenteric lymph gland, and a few tuberculous nodules in the lungs. The bronchial and the posterior mediastinal glands were also affected, and there was a caseo-calcareous tuberculous nodule in the spleen. Griffith (1917) stated that this case was apparently the only case of natural tuberculosis in the goat in which the type of tubercle bacillus has been determined. Little (1924) recorded a single case of tuberculosis in a female pedigree goatling, 18 months old. At the age of one year spontaneous lactation commenced and soon afterwards she started losing condition. Six months later, being unable to rise, the goat was destroyed. No diarrhoea was noticed and only a slight cough developed a few weeks before disposal. The goat was bred and hand reared on the owner's farm, being fed on goat's milk and occasionally cow's milk. The milking cows were not tuberculin tested but were all in very good condition. The sister and dam of the affected goat appeared healthy, and her grandmother was destroyed after developing "gid." Her great-grand dam, which was a heavy milker, was said to have had an enlargement of the udder although her milk was normal. She had been sold by the time this case was investigated. *Post-mortem* examination of the goatling revealed extensive emaciation, two white nodules the size of No. 6 shot in the spleen, and enlarged mesenteric glands, some with caseating centres. The lungs revealed extensive consolidation with caseation, and the bronchial and mediastinal glands were also affected. Parts of the affected viscera were submitted to M'Fadyean, who reported that the lesions were quite typical of tuberculosis in the goat, although he was unable to demonstrate tubercle bacilli in smears. Guinea-pig inoculations gave positive results, supported by microscopical demonstration of the bacilli in smears from affected glands (Mattick, mentioned by Little, 1924). Krishna Iyer (1932) recorded six cases of naturally acquired tuberculosis in goats in India. Identification of one strain of *Bacillus tuberculosis* recovered from the first case pointed to the conclusion that it was of the bovine type. Plum (1935) mentioned that Wwendensky reported eight cases of tuberculosis in goats. The infective agent in three of them was of the avian type. Carmichael (1937) recorded 11 cases of naturally acquired tuberculosis in goats all of which were of bovine origin. Beller (1941) discussed the incidence of tuberculosis in goats in Germany as recorded from abattoir statistics. He observed 35 tuberculous goats during 1939-41 and carried out type determination by cultural methods, concluding that in all cases the organism was of the bovine type; Beller (1944)

recorded 17 further cases of tuberculosis in goats, which he observed during 1941-44. The infection in all these cases was of the bovine type. After making various observations and studies on these goats, Beller came to the conclusion that goats have no particular resistance to infection with tuberculosis. Wilson & Miles (1948), discussing tuberculosis in animals from the bacteriological point of view, stated that the human, bovine and avian types are met with varying degrees of frequency. These authors tabulated the results of different investigations carried out mainly in England. Thirteen cases of tuberculosis in goats are recorded in this table, all of which were of the bovine type.

A number of experimental infections of goats with tubercle bacilli have been recorded. Eastwood (1906) investigated the susceptibility of goats to bovine and human tubercle bacilli. He concluded that goats fed or inoculated subcutaneously by either type developed severe progressive forms of the disease. With tubercle bacilli of either type of lower virulence, the goat, like the bovine, seems to possess a high power of resistance. Griffith (1911) investigated the susceptibility of goats to avian tubercle bacilli. His experiments were carried out on 15 goats : four were inoculated intravenously, seven subcutaneously, and four were fed the infective material. With intravenous inoculation an acute septicaemic type of tuberculosis developed and the two goats died 35 and 40 days after infection. After subcutaneous inoculation caseous abscesses developed at the site of inoculation and in most instances the regional and abdominal lymph nodes were involved as well. With feeding experiments tuberculous lesions developed in the lymph nodes along the alimentary canal and in two young kids aged five days large doses of avian bacilli were followed by severe ulceration of the intestinal mucosa. Plum (1925) mentioned that De Jong infected a goat by feeding it with avian tubercle bacilli on several successive occasions. Necropsy on this goat some months later revealed a few tuberculous lesions in the mesenteric lymph nodes. He stated also that Bang experimentally infected a number of goats, varying in age, with avian tubercle bacilli, by subcutaneous inoculation and by feeding. Bang found that in all cases there was extensive tuberculosis of the intestine and of the lungs of varying severity. Beller & Ehrenreich (1941) and Beller & Latschar (1941) carried out clinical observations, pathological, bacteriological, serological and allergic examinations on a number of goats. The goats examined showed marked sensitivity to the single intradermal tuberculin test, where a skin thickness increase exceeding 4 mm. was taken as positive. The complement fixation test was considered as an indication of the progressiveness of the infection.

The presence of tubercle bacilli in the milk from tuberculous animals whose udders are otherwise free from any detectable signs of the disease offers an interesting problem for research. To settle this point Griffith (1911) carried out a number of experiments with the three main types of bacilli. Four cows and seven goats, originally negative to the tuberculin test, were infected. Milk from these animals was then examined at frequent intervals. Of the seven goats, five were inoculated subcutaneously, one intravenously and one was fed with the infective material. From two goats, one subcutaneously infected and one fed with the infective material, the milk proved free from tubercle bacilli at all times. With the other five goats and four cows the bacilli of bovine and human type escaped through the normal udder tissue. Griffith (1927) carried out two experiments on excretion of avian tubercle bacilli in the milk of goats after subcutaneous inoculation. In the first experiment a goat was inoculated with 20 mg. of avian culture. Three months later this goat kidded and milk withdrawn three days later was sterile. This goat was killed 320 days after inoculation and the milk drawn from the right half of the mammae contained tubercle bacilli. In this second experiment he inoculated a goat with 100 mg. of avian culture. Fluid was collected in small quantities from both halves of the udder 24 hours after inoculation, and on five subsequent occasions up to the 28th day. The six samples were free from tubercle bacilli. Mammary fluids collected from the right half 211 days after inoculation were positive, and remained so up to the last collection 20 months after inoculation. Griffith suggested the negative findings to be due to the bacilli failing to pass from the blood to the milk sinuses, probably because the udder was not functioning when the goats were inoculated. However, he continued his observations on the second goat and in 1931 published the results obtained. This second goat gave birth to a still-born kid in 1927 ; to two kids in 1928, one of which was found dead and the second being killed 120 days later, and in 1930 the nanny again gave birth to two kids. None of the three kids that remained alive after birth reacted to avian tuberculin while the nanny reacted vigorously to the same tuberculin each time it was tested. The five kids were free from any sign of tuberculosis at necropsy and cultures from lymphatic glands were sterile. An interesting finding in this experiment is that the last two kids, although suckled on their mother's milk since birth and thus having ingested avian tubercle bacilli, showed no evidence of tuberculosis when killed at four and eight months old. Griffith thus concluded that young goats are quite resistant to small doses of avian tubercle bacilli taken naturally with the food and further suggested that failure of tuberculosis to develop in the kids may have been due to an immunity transmitted from the infected mother. Avian bacilli were detected in the milk of this goat over a period of five years after its inoculation, although its udder remained free from any enlargement, induration or nodular infiltration of the glandular tissue. From these experiments Griffith came to the conclusion that the milk of a naturally tuberculous animal without udder tuberculosis will contain tubercle bacilli if during the course of the disease the organisms gain access to the systemic circulation.

From the above review of the susceptibility of the goat it appears that a knowledge of the incidence of the naturally acquired disease in this animal would be of value. Accordingly, particulars of an outbreak in a herd of goats which came under our observation during 1949 are here recorded.

History

The disease occurred in a herd of 78 goats, the majority of which were pedigree and non-pedigree British Saanens. The goats were housed in a wooden shed, each adult goat having a separate pen. The younger animals were kept one, two, or three in a pen, according to the size of the animals and the accommodation available. The billy goats were housed separately at the further end of the exercise paddock which was shared by the whole herd. The paddock was merely a cinder patch, considerable trouble having been experienced with parasitism in earlier years when the patch had been grass. The goats were housed each night. Each pen had its own hay rack and water, and short feed was provided in buckets fixed to the pen doors.

There was no contact with outside animals. The herd was almost self-contained, although a few kids were bought each year to maintain numbers, and it was occasionally necessary to buy a pedigree billy goat. Tuberculin testing had not been practised.

The kids were reared by allowing them to suckle their dams for the first four days of life, and were then bottle-fed on mixed milk from the lactating goats.

The first subject in which tuberculosis was detected was a female kid, No. 378, aged 3½ months. This animal came from a herd of 76 goats. She was one of twins born to an eight-year-old nanny which had been bought into the herd as a young kid. The history of the nanny showed that she suffered from a slight mastitis when one year old and again when two years old. On each occasion the administration of sulphapyridine by mouth appeared to effect a cure. A month later the nanny kidded normally and was injected with calcium borogluconate as a precaution ; blood samples taken before injection showed the calcium level to be 6·5 mg. per cent. serum. Following the routine practice in this herd, the twins suckled their dam for the first four days of life and were then bottle-fed. When they were 71 days old both twins developed inappetence and severe diarrhoea and both were treated with a mixture of sulpha drugs, astringents and penicillin. Goat 378 showed a little intermittent improvement until death occurred 30 days after the onset of symptoms. It is interesting to note that the other twin, No. 379, showed considerable improvement after this treatment. The routine practice to register the bodyweights of kids in this herd made it possible to trace the weights of the affected twins. These are recorded below.

Age in days	Weight in lb.	
	Dead kid (378)	Sister kid (379)
20	12·5	13·0
27	14·5	16·5
31	20·5	23·0
38	22·5	25·0
52	28·0	26·0
59	30·5	27·0
66	29·0	28·0
73	27·0	26·0
80	25·5	29·0
87	24·5	31·0

From this table it appears that the dead kid ceased to gain weight when two months old, from which time it started to lose weight. The diarrhoea was first observed 10 days after the highest weight was recorded.

PROTOCOLS

Post-mortem Examination (Kid No. 378)

The carcase of a dead kid was sent to this laboratory on July 23rd, 1949, for report on the cause of its death. On necropsy it exhibited all signs of wasting. Lymphatic glands of the neck were normal, so were the lungs, and bronchial and mediastinal lymph nodes. The heart was flabby. Examination of the abdominal cavity revealed the presence of half a pint of dropsical fluid which was transparent and colourless. The liver showed a large number of pin-point necrotic foci, the gall bladder was distended and the hepatic glands enlarged. The stomach and spleen were normal. The small intestine was markedly inflamed, showing a number of necrotic ulcers up to an inch in length. Caecum and colon were also inflamed but without ulceration. All mesenteric lymph nodes were grossly enlarged, averaging about 5 cm. diameter, and one of them draining the middle part of the small intestine was approximately 7·5 cm. in diameter. Kidneys showed a few pin-point necrotic foci in the cortex.

Examination of the enlarged mesenteric glands showed caseating centres of different sizes and the largest gland was almost wholly necrotic and filled by a yellow caseous mass. At that stage tuberculosis was suspected and smears prepared from the mesenteric lymph nodes showed acid-fast organisms resembling *Mycobacterium tuberculosis*. Smears from the peritoneal fluid did not show any tubercle bacilli.

Goat 61, the mother of the dead kid 378, was suspected as the immediate source of infection. Negative results were obtained from microscopical and biological examination of her milk.

In the light of these findings the whole herd of goats was subjected to the single intradermal comparative tuberculin test, using the Weybridge P.P.D. avian and mammalian tuberculin. The test was completed on July 28th, 1949, the results showing that out of 76 22 were positive or suspicious reactors to either of the tuberculins. The first goats to be chosen for destruction and *post-mortem* examination were those which showed a greater sensitivity to the mammalian tuberculin, although some were chosen for other reasons, such as old age and low value.

Table I
Goats Examined, Dates of their Necropsy, Number in which Macroscopic Lesions were found and Number from which Smears were Positive

Lot number	Date of necropsy	Number examined		Age			Number in which lesions found	Number from which smears were positive
		Identity number	Total	Years	Months	Days		
I ...	4.8.49	61		8	3	3		
		379	4	—	3	26	4	3
		386		—	3	27		
		375		—	3	29		
II ...	31.8.49	392	1	—	4	7	1	1
III ...	21.9.49	356		—	6	11		
		376	4	—	5	13	4	3
		382		—	5	20		
		389		—	5	11		
IV ...	28.9.49	256	1	2	5	3	1	1
V ...	29.9.49	372	1	—	5	29	1	1
VI ...	6.10.49	355		—	7	12		
		368	4	—	6	19	4	1
		387		—	6	11		
		B.S.G.		3	—	—		
VII ...	7.10.49	377	1	1	2	2	1	—
VIII ...	16.11.49	100		6	6	27		
		318	4	1	8	22		
		388		—	6	22	3	—
		393		—	6	5		

Table I (*continued*)

Lot number	Date of necropsy	Number examined		Age			Number in which lesions found	Number from which smears were positive
		Identity number	Total	Years	Months	Days		
IX ...	8.12.49	314		1	9	17		
		385	3	—	8	7	2	—
		F.G.		1	10	—		
X ...	23.3.50	316	2	2	1	1	2	—
		326		2	—	25		
XI ...	30.3.50	338	1	2	—	21	1	—
XII ...	18.5.50	396	2	—	11	21	—	—
		S.G.		1	—	8		
XIII ...	30.5.50	323	1	2	3	2	1	—
XIV ...	1.6.50	226	2	3	6	—		
		309		2	3	12	2	—
XV ...	21.9.50	352	2	1	6	27		
		371		1	6	23	2	1
XVI ...	25.9.50	127	1	6	—	—	—	—
XVII ...	29.9.50	165	1	5	—	—	1	—
XVIII ...	4.10.50	342	1	2	5	19	—	—
XIX ...	9.10.50	222	1	4	—	—	1	—
XX ...	7.3.50	383	1	2	11	6	—	—
XXI ...	27.7.51	449	1	—	5	21	1	—
			39				32 (82·05 per cent.)	11 (28·22 per cent.)

Cultures from caseating material from the lymph nodes were made and experimental animal inoculations performed. Sections were also prepared for histological study. The bacteriological, biological and histological results of this investigation will be dealt with in separate communications.

Table I summarises the results of the necropsis of the 41 goats.

Smears were made from lesions whenever these were recognised or suspected and the presence or absence of acid-fast bacilli with short description of their morphology was recorded. Although no direct correlation between the appearance or the extent of lesions and number or morphology of organisms encountered was evident, yet it seemed to us that their presence and their numbers were linked with the nature of the disease. That is, bacilli were more numerous whenever the disease appeared progressive, and were absent or present in small numbers whenever the lesions were encapsulated or calcified and the general condition of the animal was good. In the latter case it could be assumed that the acquired infection was overcome by natural body defences.

The following is a short description of the *post-mortem* findings in four out of 41 goats, most of which had given a positive or suspicion reaction on one or more occasions.

Gross Autopsy Findings

Lot I

Goat 61 (nanny of dead kid No. 378).—In good condition. Udder indurated, particularly right half which was pendulous and larger than left half. A small caseated nodule about 8 mm. in diameter was noticed in the former. Small caseated nodules in posterior aspect of udder, some of which were calcified. Lungs pale with fibrous areas in middle part of dorsal aspect of right lung. Heavy worm infestation (*H. contortus* and *Trichostrongylus* species). Jejunal mesenteric lymph glands oedematous with inflamed areas. Smears from udder lesions showed single acid-fast bacilli. From lungs one single bacillus was identified.

Goat 379 (twin to dead kid No. 378).—In poor condition. During life firm swelling could be palpated in the abdominal cavity. Hepatic glands enlarged and fibrous with no signs of caseation. All mesenteric glands enlarged from 7·5 by 2·5 cm. to 3 by 2 cm. Caseation involved the outer 1·5 cm. of cortex of the largest mesenteric gland, while involving the whole tissue of other mesenteric lymph nodes. Mucosa of small intestine inflamed and ulcerated in parts. Smears showed numerous single acid-fast bacilli from mesenteric lymph nodes; smears from the hepatic glands were negative.

Goat 386.—In good condition. Slight enlargement with inflamed spots in right and left retropharyngeal lymph nodes. Hepatic and iliac lymph nodes exhibited similar features. Mesenteric lymph nodes moderately enlarged, varying from 2·5 by 1·2 cm., their cut surface pale and fibrous. Ileo-caecal lymph nodes 5 by 2·5 cm. with caseous areas in cortex. Multiple small ulcers in jejunum of 3 mm. diameter. Smears from mesenteric lymph nodes showed scattered acid-fast bacilli.

Goat 375.—In good condition. Respiratory organs and glands normal. Mesenteric lymph nodes enlarged, the biggest being 5·2 by 2·5 cm. with caseated areas and slight degree of calcification. Small intestines showed multiple small early ulcers. All smears negative.

Summary of *Post-mortem* Results

Post-mortem examination was carried out on 41 animals, the foregoing four detailed reports being representative of the *post-mortem* lesions.

In general, the condition of the animals was good in all but a few cases, despite the fact that in some instances the lesions were extensive, the most striking one encountered being ulceration of the small intestine. Whilst in some cases only a few ulcers were observed, in others there were several hundreds. Ulcers were present in nine cases, haemorrhages and enteritis in two.

Enlargement and oedema with or without caseation were observed in association with the following glands : pharyngeal, hepatic, iliac, mesenteric, ileo-caecal, supramammary, sub-maxillary, bronchial and mediastinal.

In two cases the udder was indurated and the associated lymph node showed caseating areas.

Organisms resembling *M. tuberculosis* were observed in smears made from mesenteric lymph nodes on six out of 19 occasions.

Possible Source of Infection

Cows milk was never used in this herd and, as described above, there was no contact between the herd and other animals.

In spite of the fact that a milk sample from goat 61 was negative for tubercle bacilli on August 2nd, 1949, a primary tuberculosis of her udder was found at *post-mortem* examination two days later. It should be emphasised that she never received intrammary medication, and that introduction of tuberculous infection by this route is thus ruled out. Both the twin kids of No. 61 (378 and 379) were suffering from alimentary lesions and can be assumed to have been infected by their dam's milk, and there is equally little doubt that the other kids of this generation were infected by drinking the bulked milk of this herd which contained 61's milk.

In this connection it is interesting that the two-and-a-half year old daughter of goat 61, goat 256, was found to be tuberculous, and it was judged that the lesions were fairly long standing.

Another possibility was the introduction of the infection by a black scrub goat "B.F.G." which was bought in the autumn of 1948. This goat was destroyed one year later (October 6th, 1949) and an intestinal distribution of the lesions was found. The lesions had advanced to caseation and calcification in the abdominal lymph glands.

Discussion

The autopsy findings of an outbreak of tuberculosis in a herd of goats are recorded. The lesions were mainly intestinal and the disease was of a progressive nature in young kids.

In the adult, the type of lesion gives the impression that infection was present for some time and had been fully or partly overcome by the body defences. Out of 39 reactors, lesions were detected only in 32, that is in 82 per cent., and it could be assumed that infection might have been so slight in these seven animals that it left no macroscopic lesions but was sufficient to set up sensitivity to tuberculin.

Summary

1. A short review of tuberculosis in goats is given.

2. A case of naturally acquired tuberculosis was detected which led to the discovery of the existence of the disease in a number of goats.

3. Out of 41 goats examined, macroscopic lesions were detected in 32 cases,.

4. The possible source of infection is discussed.

Acknowledgments.—We should like to express our thanks to Dr. A. W. Stableforth for helpful criticism and advice.

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CLINICAL COMMUNICATION

VITAMIN E DEFICIENCY AMONG DAIRY CALVES FED ON COCONUT MEAL

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It is of interest to record the first known case of vitamin E deficiency, commonly known as white muscle disease, in Jamaica. This occurred among some calves which were growing rapidly.

The affected animals were fed a balanced ration and were grazing irrigated guinea grass, considered to be of excellent quality and which might be expected to supply adequate vitamin E. As part of the concentrate ration the calves received coconut meal, some of which had probably become rancid on storage.

Subject (1).—Calf (Bulkin), born 24.11.51.

When called to this calf on 19.9.52 I found on arrival that the animal had a temperature of 102° F. The appetite was poor. The visible mucous membranes were pale. The faeces were rather firm. There was tympanites with no rumen movement. A particularly noticeable feature was inco-ordination of the hind limbs, which appeared to be a sequel to injury in the lumbar region, or due to muscular weakness and stiffness.

Treatment.—This consisted of a single drenching with a mixture containing sodium sulphate, aromatic spirits of ammonia and tincture of ginger.

The next day, since there was no change in the condition of the animal, it was given ammonium carbonate, nux vomica and mineral oil.

There was no improvement and the calf died on 28.9.52.

Post-mortem Findings.—There was blood-tinged fluid in the pleural and pericardial cavities. The lungs were oedematous and showed what appeared to be pneumonic lesions. There was passive congestion of the liver.

The musculature of the hind limbs showed whitish streaks, presumably indicating a degenerative condition. Similar pale areas were found in the musculature of the heart.

Subject (2).—Pure-bred Jersey heifer calf, born 6.11.51, and in the same herd as calf No. 1.

When seen on 10.10.52 this animal had a temperature of 102° F., anorexia, pale mucous membranes and appeared to be suffering from chronic bloat.

Treatment.—This was similar to that given to calf No. 1. The calf died the following morning before vitamin E could be administered.

Post-mortem Findings.—The autopsy was made by Mr. S. L. Hignett, of the Wellcome Veterinary Research Station, who confirmed the diagnosis of white muscle disease.

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Conclusions

Since withdrawal of the coconut meal from the ration there have been no further cases of white muscle disease in the herd. Presumably the oil, rancid or otherwise, in the coconut meal destroyed the naturally occurring tocopherols in the ration and led to a conditioned vitamin E deficiency with resulting muscular dystrophy in the two cases described.

However, the validity of the above hypothesis cannot be assessed until further observations have been made on the effect of feeding both fresh and rancid coconut meal.

My thanks are due to Mr. S. L. Hignett, who was in Jamaica at the time these cases occurred and confirmed the diagnosis of muscular dystrophy, probably resulting from vitamin E deficiency, in the second calf.

REVIEW

[**Diseases of Domestic Animals in Australia. Part IV. Protozoan and Viral Diseases.** By H. R. Seddon, D.V.Sc. Commonwealth of Australia. Department of Health Service Publication (Division of Veterinary Hygiene) No. 8. 1952.]

The virus and protozoal diseases of the domestic animals in Australia are described, 111 pages being devoted to the former and 88 pages to the latter. The author succeeds in his aim of showing their prevalence, economic importance, and the steps taken to control them.

The most important protozoal disease has been tick fever of cattle, due to *Babesia bigemina* and *B. argentina*, and presumably was introduced into Australia with the tick *Boophilus microplus*, which is the vector of both species of protozoa. The disease is enzootic in north Australia and in the east extends as far south as the north-east of New South Wales. It is a scheduled disease and notification is enforced outside the enzootic areas. The vector has tended to spread southwards, the disease following about one to two years later. Dipping measures are now arresting the southward extension of the ticks' habitat. In enzootic areas immunisation is practised but it is forbidden near the limit of tick infested country, where dipping is enforced. Both causative species are susceptible to acaprin. Anaplasmosis is also transmitted by the same vector but it is of less consequence than tick fever. Sterility due to *Trichomonas foetus* has been recorded on 23 properties in four States. Coccidiosis occurs in poultry, cattle and sheep : fatal infections are encountered in puppies but not in cats.

Foot-and-mouth disease, rinderpest, equine encephalomyelitis, African horse sickness, equine infectious anaemia, rabies, Aujeszky's disease, sheep pox, Teschen disease, Newcastle disease and swine fever are not present in Australia. Rabies and foot-and-mouth disease were recorded in the last century and rinderpest (1923), Newcastle disease (1930 and 1932), and swine fever (1902, 1927 and 1942) have occurred in this century.

Pustular dermatitis (contagious ecthyma) is very prevalent in sheep and is of some economic consequence, both in itself and because, owing to its infectivity for man, it is difficult to get an infected flock sheared. Cross immunity experiments proved the homogeneity of Australian strains of the virus and their identity with English strains. Vaccination has been employed successfully to control the disease. Ephemeral fever (three-day fever) is widespread in cattle in north and east Australia. Although recovery from it takes place quickly and mortality is low (0·5 per cent.), on first appearing in a district its explosiveness may produce quite serious economic dislocation. In poultry, besides fowl pox, diseases involving the respiratory tract are represented by infectious laryngotracheitis, infectious avian catarrh and chronic respiratory disease of fowls. Avian encephalomyelitis (epidemic tremor) occurs, as do the avian leucoses, which, although widespread, probably cause less serious loss than in U.S.A. and Britain. Swine pox and cow pox and infectious papillomatosis of bovines occur. Infectious pneumonia of swine seems to resemble the chronic disease so widespread in Britain, preventing pigs from thriving rather than producing symptoms of acute pneumonia in them. Canine distemper, including "hard pad," canine hepatitis, feline panleucopenia and infectious feline catarrh, are recorded.

A virus related to Japanese B, St. Louis and West Nile encephalitis viruses was isolated from a human outbreak in 1950-51 in the Murray Valley, the disease probably being the same as that which had occurred 30 years before and then known as Australian X encephalitis. Antibodies to Murray Valley encephalitis virus have been found in horses, dogs, fowls and wild birds. Native parrots and related species carry psittacosis which has, however, given no indication of having high virulence for man. There is evidence suggesting that enzootic abortion of ewes due to a virus of the psittacosis-lymphogranuloma group may occur in New South Wales. Myxomatosis virus has been used in attempts to reduce the rabbit population and in some cases epizootics occurred among rabbits which were checked only by the onset of winter. It would appear that some vector, possibly mosquitoes, is necessary to attain this result but the required conditions do not yet seem to be fully understood.

The report is readable, informative and well documented.

ABSTRACT

Bovine Tuberculosis in Mink and Treatment with "Rimifon"*

The symptoms and macroscopic lesions of tuberculosis in mink are described.

The incubative period of tuberculosis in this animal appears to be from one to three months, the first symptoms observed being depigmentation of the external nares, nasal discharge, watering eyes, anorexia and subsequent loss of weight.

Many animals develop swellings and abscesses of the anterior cervical lymph glands. There is no coughing until the terminal stages of the disease.

Seven hundred and fifty mink were subjected to the intradermal tuberculin test using mammalian tuberculin, but none of the animals showed any reaction 72 hours later.

Considerable success in treatment is reported by the use of Rimifon (Roche brand of isoniazid) which is considered to have no effect on organisms other than those of the acid-fast group. Prolonged administration at low concentration was harmless to rats.

The human dose of 4 mg. per kg. of bodyweight per day was adopted and fed for 10 days. This treatment appeared to give good results in all except the most advanced cases.

N. S. B.

* **An Outbreak of Bovine Tuberculosis in Mink and Treatment with "Rimifon."** Pulling, F. (1952). *J. Amer. vet. med. Ass.* **121.** 389–390.

QUESTIONS IN PARLIAMENT

Attested Cattle

Mr. de Freitas (June 24th) asked the Minister of Agriculture what proportion of the cattle in England and Wales are attested; and whether he will circulate in *Hansard* a detailed list setting out the proportions by counties.

Sir T. Dugdale: Thirty-seven per cent. of the cattle in England and Wales are attested. The proportions by counties are as follows:—

England

	Per cent.		Per cent.
Bedford	29	Norfolk	32
Berks	60	Northampton and Soke of Peterborough	19
Buckingham	35	Northumberland	20
Cambridge	35	Nottingham	18
Isle of Ely	9	Oxford	45
Chester	30	Rutland	7
Cornwall	26	Salop	30
Isles of Scilly	100	Somerset	43
Cumberland	66	Southampton	53
Derby	21	Isle of Wight	52
Devon	33	Stafford	18
Dorset	52	Suffolk, East	41
Durham	35	Suffolk, West	45
Essex	45	Surrey	54
Gloucester	39	Sussex, East	39
Hereford	34	Sussex, West	50
Hertford	49	Warwick	28
Huntingdon	18	Westmorland	84
Kent	38	Wilts	47
Lancaster	33	Worcester	28
Leicester	20	York (East Riding)	9
Lincoln (Holland)	4	York (North Riding)	28
Lincoln (Kesteven)	15	York (West Riding)	29
Lincoln (Lindsey)	11		
Middlesex	35		

Wales

	Per cent.		Per cent.
Anglesey	35	Glamorgan	35
Brecon	66	Merioneth	82
Caernarvon	57	Monmouth	32
Cardigan	100	Montgomery	68
Carmarthen	100	Pembroke	78
Denbigh	47	Radnor	44
Flint	27		

Swine Fever Epidemic

Mr. Hurd (June 25th) asked the Minister of Agriculture if the epidemic of swine fever has now been checked; and when he expects to be able to relax the movement restriction on pigs.

Sir T. Dugdale: Yes, Sir; the epidemic does appear to be subsiding, but it is too early as yet to remove the restrictions imposed by the Order made last April. If the favourable downward trend continues I hope to be able to consider doing so in about six or eight weeks.

Mr. Hurd: Does my right hon. Friend feel he has the problem in hand and we are not likely to get any further extensions of the outbreak?

Sir T. Dugdale: It would never be safe to make any forecast about a disease of this nature, but the figures do show me that the steps we have taken have been effective and, if they continue as they are now, it will be possible to relieve these areas in about six or eight weeks' time.

Fowl Pest

Sir L. Ropner (June 25th) asked the Minister of Agriculture what steps are taken to ensure that all keepers of poultry are informed of the locations of outbreaks of fowl pest.

Sir T. Dugdale: Particulars of every outbreak are sent to the principal poultry journals, to the headquarters of the National Farmers' Union, to the Accredited Poultry Breeders' Federation, the Animal Health Trust and to the British Veterinary Association. In addition, each outbreak is notified by telegram to the county branch of the National Farmers' Union, the area egg officer of the Ministry of Food and all the egg packing stations concerned.

NOTES AND NEWS

Diary of Events

July 6th.—Special Meeting of the Council of the Society of Practising Veterinary Surgeons, at Rugby (The Grand Hotel), 2.30 p.m.

July 7th.—Special Joint Meeting of the Lincolnshire and Eastern Counties Divisions, B.V.A., at the Grand Hotel, Peterborough, 2.30 p.m.

July 9th.—Special Meeting of Council, B.V.A., at the Connaught Rooms, Great Queen Street, Kingsway, W.C.2, 11 a.m.

July 15th.—Summer Meeting of the Lancashire Division, B.V.A., at Aintree, 3 p.m.

July 15th.—Meeting of the Editorial Committee, B.V.A., 2 p.m.; Executive, 3 p.m.

July 16th.—Annual General Meeting of the Association of Veterinary Teachers and Research Workers (Northern Region) at the Veterinary Investigation Centre, Quarry Dene, Weetwood Lane, Leeds, 11 a.m.

July 16th.—Summer Meeting of the Central Veterinary Society, B.V.A., at the Wellcome Research Station, Frant, Tunbridge Wells, 11.30 a.m.

July 17th.—Summer Meeting of the Mid-West Veterinary Association, B.V.A., at the University of Bristol Veterinary School, 2 p.m.

July 17th.—Meeting of the Yorkshire Division, B.V.A., at the Government Buildings, Crosby Road, Northallerton, at 2.30 p.m.

July 17th.—Annual General Meeting of the Association of Veterinary Teachers and Research Workers (Southern Section) at the Rothamsted Experimental Station, Harpenden, Herts, 11.15 a.m.

July 23rd.—Meeting of the Midland Counties Division, B.V.A., at Nuneaton (The Newdigate Arms).

July Meetings of B.V.A. Council and Committees

At 36, Gordon Square, London, W.C.1

Wednesday, July 29th, 1953.
11 a.m., Organising Committee.
2.15 p.m., Home Appointments Committee.
4 p.m., Parliamentary and Public Relations Committee.
Thursday, July 30th, 1953.
10 a.m., Veterinary State Medicine Committee.
12.30 p.m., Finance Sub-committee.
2 p.m., General Purposes and Finance Committee.

At the Connaught Rooms, Great Queen Street, W.C.2

Friday, July 31st, 1953.
11 a.m., Council meeting.

Aug. 9th—15th.—XVth International Veterinary Congress, Stockholm, Sweden.

Sept. 6th—12th.—Seventy-first Annual General Meeting and Congress of the British Veterinary Association, at Aberdeen.

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INTERNATIONAL DAIRY CONGRESS

On Saturday of last week there ended the 13th International Dairy Congress, held at The Hague, Holland, and attended by some 2,000 delegates from all over the world: the United Kingdom contingent numbered 300.

The papers submitted covered a vast field. Calf rearing was the subject of a contribution from a group of research workers from the Royal Veterinary College, London, and the N.I.R.D., Shinfield. It stated categorically that it was hazardous for newborn calves to be collected together from several sources, particularly if they were denied colostrum. Under such conditions they were extremely susceptible to infection with white scours. Two important contributions from Denmark dealt with disease eradication. Mr. P. Livoni, National Federation of Danish Dairy Associations, described a pilot campaign against mastitis on the island of Samso, where there are 712 herds (5,025 cows) all free from tuberculosis and contagious abortion. In this campaign, only measures which could normally be used in practice were employed. These included isolation, treatment with penicillin and disinfection of cow houses. On Samso the number of infected herds was reduced from 484 to 83 in only 20 months. Details of the Danish campaign against contagious abortion were given by Mr. A. Suurballe, of the Veterinary Directorate, Copenhagen, who told the conference that the percentage of infected herds in his country had dropped from 24 to 6·3 during the period 1947 to 1952.

PERSONAL

Births.—Anderson.—On June 26th, 1953, at Aylesbury, to Jo and Guy Anderson, a son.

Appleby.—On June 5th, 1953, at Edinburgh, to Josephine, wife of Edwin Calvert Appleby, B.Sc., PH.D., M.R.C.V.S., a son—Robert Charles.

Greenough.—On June 25th, 1953, to Pauline, wife of Paul R. Greenough, M.R.C.V.S., of Castle Cary, Somerset, a daughter—Anne Louise—a sister for Timothy and Rosalyn.

Lakin.—On June 5th, 1953, at Winchester Hospital, to Patricia, wife of C. N. S. Lakin, M.R.C.V.S., a daughter—Dorcas Jane.

Marriage.—Edwards—Collcutt.—On June 18th, 1953, at St. Michael's Church, Wood Green, Thomas Wynn Edwards, M.R.C.V.S., only son of Mr. and the late Mrs. D. D. Edwards, of Wood Green, London, to Mary Charmaine, younger daughter of Mr. and Mrs. C. M. Collcutt, of Bounds Green, London. The best man was D. W. B. Sainsbury, B.Sc., M.R.C.V.S.

Ministry's Veterinary Field Staff.—The following transfers and appointments are announced:—

Mr. W. M. Salmon, M.R.C.V.S., Veterinary Officer, has been transferred from Dorchester to Llandrindod Wells.

Mr. A. Ross, M.R.C.V.S., Veterinary Officer, was transferred from Bury St. Edmunds to Louth on June 29th, 1953.

Mr. N. D. Ritchie, M.R.C.V.S., has been appointed to the permanent staff as a Veterinary Officer and will be stationed at Aylesbury.

Mr. W. H. G. Rees, M.R.C.V.S., B.Sc., has been appointed to the permanent staff as a Veterinary Officer and will be stationed at Stafford.

Mr. E. V. H. Studdy, M.R.C.V.S., has been appointed to the permanent staff as a Veterinary Officer and will be stationed at Maidstone.

Royal Army Veterinary Corps.—Captain F. H. Orr to be Major, June 1st, 1953 (*London Gazette* announcement: Supplement dated June 16th, 1953).

University of Wisconsin, U.S.A.—At the Commencement Ceremony held on June 19th, 1953, the degree of Master of Science was conferred on Mr. M. F. Redfearn, M.R.C.V.S., and Mr. G. R. Scott, B.Sc. (Edin.), M.R.C.V.S. Mr. Redfearn's thesis was entitled "Cutaneous Hypersensitivity in Experimental Brucellosis of Guinea-pigs" and Mr. Scott's "The Growth of Newcastle Disease Virus in Isolated Chorio-Allantoic Membranes."

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R.C.V.S. OBITUARY

Turner, Edward George, D.S.O., Colonel late R.A.V.C., 22, The Close, Horley, Surrey. Only son of the late Mr. and Mrs. E. H. Turner, of Iffley, Oxford. Graduated London, December 19th, 1908. Died June 22nd, 1953.

Williamson, David Ritchie, M.R.C.V.S., Major R.A.V.C. (S.R.) (retd.), Senior Veterinary Inspector, Parliament Buildings, Stormont, Belfast. Graduated Edinburgh, December 14th, 1912. Died February 20th, 1953.

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SEVEN CALVES AT A BIRTH

In its issue of June 20th the *Shields Gazette* states: "One of the 35 Friesian and mixed-Friesian cows at Messrs. A. and S. Gibson's Horsley Hill Farm gave birth to seven calves to-day. But the calves, five of which were fully developed, were all dead. Cow No. 13—for that is her number in the herd—is a five-year-old Friesian and this was her second calving. The first was quite normal, so to-day's happening came as a surprise. The veterinary surgeon who attended No. 13 told a reporter: 'I don't know if this is a record, but I have never heard of anything like it before.'

"Note.—The Ministry of Agriculture and Fisheries say that this is undoubtedly a record for such a birth to take place naturally. Five calves have been produced artificially for experimental purposes—but they also were born dead."

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SLAUGHTER OF HORSES

In its annual report, recently published, the International League for the Protection of Horses states that English people, owing to the shortage of other meat, have acquired a taste for horse-flesh and the demand increases. It thus happens that "meat men" attend all the horse auctions and buy large numbers of horses for slaughter in this country for human consumption. For aged and done horses this is probably the best solution, the report continues, provided they fall into the hands of reputable firms of horse slaughterers. "But these horses are not all aged; on the contrary, very many are in their prime. Much as the International League would like to intervene on behalf of these horses to prevent them from an untimely death it would for obvious reasons be impracticable. We maintain that the responsibility rests with their owners, who should ensure that their redundant horses are sold to reputable persons under guarantee that, when the animal is no longer required, it will be returned at a fair valuation, or, when unfit for work, will be humanely put down in the presence of a reliable person." The report states that the problem of redundant horses is caused largely by mechanisation. Horses belonging to local authorities, British Railways and horse-transport firms are being offered for sale at auction.

Britain last year bought one-third of Eire's total export of 33,000 horses for slaughter. The horses-for-slaughter trade was worth £3,526,000 to Eire. A total of 52,899 horses was reported to have gone to slaughterhouses in Britain. Even mares in foal, unbroken ponies and donkeys are bought by slaughterers, it is stated.

In the export of Irish horses to Belgium the report says: "The horses are fed and watered aboard ship and this is the last food they get, though they may not be killed for three or four days after they arrive in Belgium. Our investigator was informed that there was no use giving meat to a thing that would soon be meat itself."

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FOOT-AND-MOUTH DISEASE IN CHESHIRE

On Thursday of last week foot-and-mouth disease was confirmed among pigs at Poynton, Cheshire. In addition to the 14 pigs, 12 cattle which had been in contact with them were slaughtered. This outbreak is the 26th this year and the first since April 24th.

The Disease in Mexico

Further particulars of the outbreak of foot-and-mouth disease in Mexico, to which reference was made in our last issue, are given in a despatch to the International Office of Epizootics, transmitted by the U.S. Bureau of Animal Industry, Amsterdam (Dr. Dale), from the United States Department of Agriculture, Washington, on May 25th, 1953. Symptoms resembling foot-and-mouth disease were first reported by a livestock owner of the Gutierrez Zamora area, Veracruz, on May 21st. Veterinarians of the joint Mexico-United States Commission inspected the animals on May 22nd and diagnosis was completed by serological tests at the Commission laboratories on May 23rd. The tests showed the infection to be type "A" foot-and-mouth disease, the type that was prevalent in Mexico from December, 1946, to August, 1951.

The Commission reported that all infected and exposed animals had been immediately slaughtered and buried and that a close inspection had been carried out in the area immediately surrounding the outbreak and in further outlying areas.

The U.S. Secretary of Agriculture closed the Mexican-United States border to imports of susceptible animals and their fresh, chilled or frozen meats.

The origin of the outbreak has not been determined: the outbreak marks the first appearance of foot-and-mouth disease in Mexico since August, 1951, when the last outbreak of the 1946-51 epizootic was eliminated.

A note from the International Office of Epizootics adds: "Special emphasis should be placed on the rapidity which characterised both the carrying out of diagnosis and the application of the eradication measures (stamping out): this prompt action should be taken as an example. It should also be observed that no vaccination procedure has been considered."

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NEW AREAS FOR DESIGNATED MILK

The Minister of Food has announced his intention of extending the areas in which only "specially designated" milk—that is, "pasteurised," "sterilised," "tuberculin tested" and (until September, 1954) "accredited"—may be sold. The new areas are Manchester, Dewsbury, Huddersfield, Chesterfield, Woking, Watford and St. Albans. Places where designation is already compulsory are: London and Portsmouth (specified in 1951); Bath, Bristol, Birmingham, Wolverhampton, Bournemouth, Liverpool, Bootle and Nottingham (specified in 1952); Brighton, Sheffield, Southampton and Stoke-on-Trent (1953); and in addition the Minister announced his intention last April of soon specifying Newcastle upon Tyne, South Essex, Reading and Plymouth and South Devon. If all the new areas are included with those already specified, the milk of nearly half the population of England and Wales will be designated. Similar steps to extend the areas for designated milk are being taken in Scotland, in consultation with the Secretary of State.

BUDGERIGARS DESTROYED

A budgerigar which Southampton police believed might be infected with psittacosis was caught and destroyed at the weekend after it had escaped from a children's home. The bird was one of nine brought to this country by seamen from South Africa and given to the home. When one died it was discovered by a veterinary surgeon that it was suffering from psittacosis and he ordered the rest to be destroyed and the cage burned.

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax:

Hants.—Greenwood Farm, Old Odiham Road, Alton (June 24).
Salop.—Newhouse Farm, Hadnell (June 22).
Somerset.—Hill View Farm, Dropping Lane, Bruton, Bath (June 23).
Sussex.—Wintersfield Farm, Pulborough (June 22).

Foot-and-Mouth Disease:

Ches.—Yew Tree Farm, Poynton, Stockport (June 25).

Fowl Pest:

Bucks.—Ten-coed, Haslemere Road, Penn, High Wycombe (June 23).
Carmarthen.—Gwastod Mawr, Llanpampsaint (June 24).
Essex.—New Hall Farm, Lower Road, Hockley (June 24).
Glouc.s.—Chestnut Farm, Twigworth (June 22).
Hereford.—Exchequer Court, Thruxton (June 23).
Herts.—Hazelbury Poultry Farm, Holwell, Hitchin (June 24).
Isle of Ely.—Hill Farm, Stretham, Ely (June 22).
Kent.—The White House, Mayfield, Tunbridge Wells (June 24).
Lancs.—No. 1 Range, Department of Poultry Husbandry, Hutton, Preston; 28, Stanhill Lane, Oswaldtwistle, Accrington (June 22); 4, Lyon Cottages, Shaw, Oldham (June 24).
Lincs.—Highfield Farm, Eagle, Lincoln (June 24).
Middx.—3, Hartland Road, Isleworth (June 23).
Northants.—Tone Cottage, and Council Allotments, Thorney, Peterborough (June 22).
Nottingham.—39, Jubilee Street, Newark; Calverton Road, Lower Blidworth, Mansfield (June 22).
Salop.—Village Farm, Sheriff Hales, Shifnal (June 22).
Sussex.—Tanners Mayes Lane, Warnham, Horsham (June 22).
Yorks.—White Lea Poultry Farm, Mytholmroyd; Furlong House, Harlington, Doncaster (June 23); Southfields Lane, Heptonstall, Hebden Bridge; Nest Lane Allotments, Mytholmroyd; Woodhouse Farm, Bawtry, Doncaster; Stanry End Farm, Mytholmroyd; Westfield Farm, Osmondthorpe, Leeds (June 24).

Swine Fever:

Beds.—The Green, Chapel End, Wilstead (June 22); Elm Pyghtle, Renhold (June 23).
Berks.—7, South View, Hungerford (June 23); 86, Lower Henley Road, Caversham, Reading (June 24).
Cambs.—Beech Farm, Harston (June 22).
Cornwall.—Sea View Farm, Blackrock, Crowan, Camborne, and Stray Park, Camborne (June 22); Baundervean, Penpounds, Camborne (June 24); Tressadern Hill, St. Day, Redruth; Westerlands, Upton Cross, Liskeard (June 25).
Essex.—Taylors Farm, Takeley (June 22); Piggeries at Bryanstone Road, West Tilbury (June 24); The Piggeries, Old Crown Lane, Kelvedon Hatch (June 25).
Hants.—Old Tilbury, Passfield, Bordon (June 22).
Hereford.—Bartestree Court Farm, Bartestree (June 25).
Hunts.—College Farm, Upton (June 23); Brook End Farm, Catworth (June 25).
Kent.—Clap Hill, Aldington, Ashford (June 24); Church Farm, West Langdon, Dover (June 25).
Lancs.—Daleside Piggeries, Chadderton, Oldham (June 24); Ribble Bank Piggeries, Ribble Bank Street, Preston (June 25).
Lincs.—Pelhams Land, Dogdyke (June 23); Skermore Road, Friskeney, Boston (June 24).
Middx.—1, Upper Park Road, Southgate, N.11 (June 24).
Montgomery.—Upper Braich, Meifod (June 24).
Norfolk.—Chapel Farm, Tuttington, Aylsham; White House Farm, West Rudham (June 22); Hall Farm, Mundham (June 23); The Stores, Findram, King's Lynn (June 24).
Northants.—Astwell Park Farm, Syresham; 53, Lodge Road, Little Houghton (June 25).
Notts.—Brynmawr, Melton Road, Stanton-on-the-Wolds (June 22).
Salop.—Railway Farm, Whillington, Nr. Oswestry (June 22); The Birches, Marton, Chirbury (June 24).
Somerset.—Sneyd Farm, Church Road, Stoke Bishop, Bristol (June 23); Tynemead Farm, Witham Friary, Frome (June 24); Marston Lane Farm, Frome (June 25).
Staffords.—7, Drive Fields, Lower Penn (June 22).
Sussex.—Valley Holme Farm, Dane Hill (June 22); Sunnydene, Henfield (June 25).
Yorks.—Church Farm, Tong Lane, Bradford (June 22); 18, High Street, Hook, Goole (June 23).

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

THE PRACTITIONER AND HIS DRUGS

Sir,—Mr. MacFarlane, in the previous issue of *The Veterinary Record*, says that " the profit accruing to the veterinarian from the supplying of drugs direct to the stockowner has become a major part of his income."

As Mr. MacFarlane states that he speaks on behalf of stockowners it is right that he, and the colleagues that he represents, should know that this is not the case.

It is disturbing to note that an agriculturally educated man should be so out of touch with the conditions prevailing in modern veterinary practice. He evidently considers himself knowledgeable enough to correspond on this subject, so it is presumed that he wrote in good faith.

Mr. MacFarlane states, further, that the chemists and veterinary surgeons have forgotten what is going to be most beneficial to the livestock industry and that we must consider the welfare of the animal.

It is remarkable that Mr. MacFarlane should take it upon himself to sit in judgment of our profession in this way, particularly as his facts are neither correct, nor his matter closely argued.

That the red, white and blue drinks are an abomination is agreed. If Mr. MacFarlane is prepared to take a little of the advice he so readily gives to the chemists and veterinary surgeons there is great work to be done here. His active engagement in a campaign to reduce the large quantities of these drenches bought by his colleagues would be the best contribution he could make to the drugs controversy and the welfare of the animal.—Yours faithfully, A. K. Kirkwood, 14 and 16, Queen's Road, Reading. *June 20th*, 1953.

Sir,—The recent correspondence on this subject, taking as it does the line of stating the views of practising veterinary surgeons, and those chemists retailing veterinary products, is only symptomatic of a deeper problem which must be faced by our profession.

The problem is best illustrated by discussing the distribution of penicillin for mastitis treatment, although the problem exists to a lesser extent with other restricted products and may well become serious with the increasing number of antibiotics and biological products which need skill and professional knowledge for indicating their use, but are simple enough for laymen to administer.

During the last few years it has been one of my duties to speak to many gatherings of farmers and to act as host to dozens of groups of farmers, and on almost every occasion one has been questioned about the restriction of the sale of penicillin.

It was obvious that many farmers had no real understanding of the basis of the restriction. Phrases such as " a vets.' monopoly," " the vets. keep it to themselves," showed an ignorance of the law and revealed an attitude by farmers of mistrust and suspicion of the veterinary profession which was depressing and very disturbing. There can be no doubt that this attitude was largely based on the feeling, rightly or wrongly, that they were being charged too much *per tube* for penicillin. The matter was regarded purely as a sales transaction between farmer and veterinary surgeon, and in a number of cases, judging by what one was told, the transaction appears to have been little more than a sale of goods. One has heard of farmers supplied by their veterinary surgeons with " dozens of boxes " and " as much as I want." One has also been told by farmers that they have been able to supply their neighbours with surplus penicillin from their own stocks. If this state of affairs is widespread, and my experience suggests that it may be so, it is not surprising that farmers generally are disgruntled with us on this matter and that they seek every opportunity to obtain penicillin illegally. Mr. Waddington's letter appears to have been written in ignorance of this attitude amongst farmers, and I believe the average veterinary surgeon

in practice hears little of it from his own clients for obvious reasons.

Having worked on mastitis for over 10 years I am quite aware that individual treatment of each case of mastitis by the veterinary surgeon is neither practical nor necessary, but I do believe that penicillin, or any other treatment, should only be provided to a farmer if the veterinary surgeon knows the herd problem as a whole, preferably based on bacteriological tests, and has the right of access to the herd when he considers it necessary. After all, the use of penicillin is restricted by law to medical practitioners, dentists and veterinary surgeons, on an implicit understanding that its use will be supervised by the practitioner concerned. Anything less than this lays us open to the charge of being "pedlars of penicillin," which others besides us feel they would like to indulge in directly with farmers.

The price per tube which farmers pay veterinary surgeons seems to vary very considerably. Probably in many cases the higher price may cover other charges for advice, travel and so on, but to the farmer it represents the price of penicillin. The bottle of medicine complex dies hard, but it is high time we had the courage to charge separately for our professional services and advice and not wrap it up in the price of our drugs.

I have burdened you with this rather long letter, Sir, because I am very concerned about this situation, which, if it goes unchecked, may well result in increasing agitation by farmers for amendment of legislation. I believe that the position could be improved greatly by a more responsible attitude on the part of some veterinary surgeons when supplying penicillin. Flagrant laxity in supplying penicillin without reasonable knowledge of the cases to be treated in my opinion constitutes unprofessional conduct which merits the attention of the R.C.V.S. Sincere discussion between the client and practitioner would in many cases open the eyes of the farmer to the real reasons for restriction, which we all agree is needed on scientific and professional grounds. A reasoned statement of the case for restriction and the attitude of the profession, if given adequate publicity, would be helpful. Might one suggest the presidential address at Congress as a suitable medium?

Finally, may I emphasise that these views are purely personal and must not be interpreted as voicing those of any other person or organisation.—Yours faithfully, D. L. Hughes, Hill Farm House, Thurgarton, Notts. *June 23rd*, 1953.

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FREEZE-PRESERVED GRASS

Sir,—May I crave the use of your columns to outline a small-scale test of what appears to be a novelty in fodder storage?

Last October some luscious pasture was cut, baled and stored in a deep freeze at −10° F. In February a bale was thawed out in daily portions of about 10 lb. and fed to a cow over a five-day period. No untoward effects were noted in this animal nor in a seven-month-old calf which received the fodder *ad libitum* for several days. Two bales returned to the farm of origin were satisfactorily fed to a group of yearling stirks, though a cow given a feed in the unthawed state scoured on the following day.

In all cases the grass was eaten greedily in preference to other foods. Its appearance was not much affected by the processes of freezing and thawing and it retained in full the fresh smell of newly mown hay. A high carotin content was reported. The weight-volume ratio of the bales was 11 lb. per cubic foot, but it is hoped that this can be improved on without expressing the juices or losing the workable texture of the fodder.

There seem some grounds for inferring that if freeze-preserved grass has any nutritional possibilities for stock they are more likely to rest in its use as a supplement to be fed in fairly small quantities rather than as a replacement for the bulky foods. This becomes abundantly clear when we consider the capital investment involved, *viz.*, something approaching £1,000 for the first 1,000 cubic feet of storage space.

I am indebted to J. S. S. Inglis, Esq., B.Sc., M.R.C.V.S., University of Glasgow Veterinary School, for testing the food and for guidance throughout, to W. B. Swan, Esq., Reston, for supplying the grass suitably baled and to J. R. C. Horne, Esq., of Messrs. Turner & Co. Ltd., Frigidaire Distributors, for providing storage space.—Yours faithfully, James Milne, Westwood, Duns, Berwickshire. *June 22nd*, 1953.

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ELECTRIC EUTHANASIA

Sir,—Dr. Sulman's letter raises several questions to which one would like to know the answers. I will not comment on the fact that he does not include the brain in the path of the current, because the effect of that condition is in a sense *sub judice* during the investigation which is being made for the B.V.A. But I would like to ask Dr. Sulman whether he took any records of the current strength, and if so, what were its mean and variance and the size of the sample? With the electrodes he describes one would expect the contact resistance, and therefore the current strength, to vary widely from case to case, and also, in any given case, from instant to instant. And did Dr. Sulman test (with the E.E.G., for example) for the presence or absence of consciousness during the 10 or 20 seconds which he found necessary for stopping the cardiac action and respiration in large dogs, and during the subsequent 10 or 20 seconds also?—Yours faithfully, C. W. Hume, The Universities Federation for Animal Welfare, 284, Regent's Park Road, Finchley, London, N.3. *June 28th*, 1953.

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BOVINE INFERTILITY

Sir,—I hope you will allow me to supplement last week's observations on catarrhal endometritis and pyometra by my gifted colleague Mr. J. G. Wilson; for four years I was engaged solely upon the clinical and autopsical study of these conditions.

Mr. Wilson mentions an apparent association between herd outbreaks of a purulent endometritis and high protein feeding. It would be interesting to know whether he or others are in a position to correlate these two factors with a third—evidence of a deficiency of iodine in the diet, or of the power to make use of it, which Mr. Peter Hignett (1953) considers also to be a concomitant. I would endorse most heartily the stress Mr. Wilson lays on the prime importance of ascertaining the rôle played by management and nutrition in the problem as a whole. Mr. Wilson's own results (1952) on manganese, etc., are here outstanding as a contribution. But his allusion to "Nielsen's *original* theory that ovarian dysfunctions arise from uterine infections" does less than justice to the memory of the Swiss workers Hess and more particularly Zschokke, who arrived in 1905 and 1900, purely by inspired and exhaustive clinical observation, at the "modern conception" that the reverse is the case. Nielsen was himself a disciple of his countryman Albrechtsen. A recent review (Dawson, 1950) includes some detail of these early arguments.

My own experience with *C. pyogenes* endometritis and pyometra does not extend to the use of intra-uterine oestrogen therapy. Mr. Wilson's reports go far to establish that an important proportion of cases resolve thus, which fail to respond to the drugs by parenteral routes. At the same time I feel bound to mention that in a series of 73 cases intensively studied with some attempt at controlled conditions, I obtained generally satisfactory results when oestrogens were given intramuscularly, and the subsequent development of cystic ovaries with nymphomania was usually conspicuous by its absence. My later experience confirms such results. Mr. Wilson refers to the tendency of uterine *C. pyogenes* infection to recur before the establishment of conception after an apparently satisfactory response to oestrogen therapy. Of my 73 cases, 66 showed disease developing *post-partum*, which is in harmony with Lovell's (1943) conception of an endogenous origin of infection and a precipitant "x factor" rendering the organism pathogenic. I had three cases showing on quite good evidence uterine resolution with elimination of the organism after treatment, but immediate reappearance of symptoms following service. *C. pyogenes* was demonstrated in semen of the only bull of the three from which a culture could be made. These results may well be interpretable as treatment eliminating the infection but not the "x factor" (nutrition, management?) with consequent re-infection from the bull. Hancock's concluding remarks to his paper (1948) showing that probably 40 per cent. of all bulls carry this organism, point out one way of avoiding such "disappointing recurrences."

In conclusion, may I, too, express my admiration of the brilliant experimental work by Mr. Rowson and Drs. Lamming and Fry. These methods clinch as certainties matters which may previously have only begun to be apparent as a result of field clinical studies—for example, the existence of a sterile purulent endometritis, with or without accumulation; and the possibility in certain circumstances of unfortunate sequelae from the use of intra-uterine iodine (Dawson, 1951).—Yours faithfully, F. L. M. Dawson, Ministry of Agriculture and Fisheries, Sterility Advisory Service, The White House, Hadstock, Nr. Linton, Cambridgeshire. *June 22nd*, 1953.

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